1. Introduction

The multimeter adopts a 15 mm high LCD with backlight, which can clearly read out the display even in dark places. It is a portable 3 1/2-bit automatic range digital multimeter with high performance and high reliability.

The whole circuit is based on integrated circuits, equipped with overload protection circuit, can be used to measure AC and DC voltage, AC and DC current, resistance, capacitance, frequency, diode, continuity test and NCV test.It can be widely used in schools, research institutes, factories, enterprises and other social fields.

2. Safety note

Warning

This series of digital multimeter is designed according to IEC61010-1 600V (CAT III) and Pollution Degree 2.To ensure correct and safe use of the meter, please read the instruction manual carefully.

In order to avoid personal injury and meter damage caused by electric shock, users should pay attention to the following safety tips.

- Do not measure any voltage beyond the measurement range specified by this meter.
- Do not apply a voltage above 100V to the terminal of the resistance measurement. although there is an internal protection circuit in the resistance measurement.
- Check whether the test lead is damaged.

- Try not to use the meter in direct sunlight or extremely high temperature environment.
- Avoid the risk of electric shock when measuring voltage over 30V AC or 60V DC.
- Before measuring the current, turn off the power first, disconnect the circuit point under test and then power on for measurement.
- Pay attention to the polarity when replacing the battery.

Note international Electrical Symbol.

⚠	Risk of Danger. Important information. See Manual.		
~	AC (Alternating Current)	▣	Double insulation
⎓	DC (Direct Current)	⎍	Fuse
≂	AC or DC	⏚	Earth Ground

3.Product overview

3-1 Product appearance and description

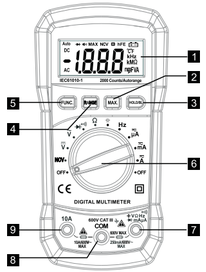

Fig. 1 Exterior view

1 Liquid crystal display (LCD) 2 "**MAX**" maximum key
3 "**Hold / BL**" hold reading and control backlight key
4 "**Range**" manual / automatic range switch key
5 "**FUNC.**" select function key
6 Rotary Switch (Knob)
7 "⇥/⊣⊢/⇢/V/Ω/Hz/uA/mA" Input terminal
8 "**COM**" terminal 9 "**10A**" terminal

3-2.Function keys

keys	Function
Func	Push "FUNC."key, can rotary switch between functions
RANGE	Short push: enter manual range and switch range; long push:Return to AUTO RANGE state.
MAX	Push "MAX." key to display the maximum , but the meter continues to sample the input signal and constantly refresh the maximumand keep it. Push "MAX." key again to remove the maximum status.
HOLD/BL	Short push: hold reading, push again to release hold reading. Long push: long push for more than 2 seconds,turn backlight on or off.

3-3. Display indicators

Fig. 2 LCD

Indicator	Meaning
AC	AC voltage or current
⬬	Negative
DC	DC voltage or current
Auto	Auto Range
⊣⊢	Diode test
⇢	Continuity test
MAX	Maximum
NCV	NCV test
H	Date Hold
▭	Low battery indicator
kHz	Frequency unit : kHz
kMΩ	Resistance units : Ω , KΩ , MΩ
nμFVA	Capacitance units : nF, μF, mF Voltage units : mV, V Current units : μA, mA, A

4 . Specification

4-1. General Specification

- Auto range.
- Display: 3 1/2 LCD.
- Overload protection: PTC protection circuit is used in resistance and frequency measurement.
- Data hold.
- Maximum measurement.
- Over-range display: "OL" .
- Battery low voltage display:"▭" .
- Auto Power Off: 15 minutes. Push "HOLD/BL" to wake up.
- Operating environment: 0~ 40°C (32 ~104 °F); <80% RH.
- Storage environments: -10~ 50°C (14~ 122 °F); <70% RH.
- Power supply:1.5V battery x2 pcs.
- Safety:IEC61010-1 600V CAT III.
- Size (LxWx H) and weight: 147.5x74x42.5mm, about 159g.

4-1.1 Accessories:

❶ Users Manual ---------- 1pc
❷ Test lead ---------- 1set
❸ 1.5V Battery ---------- 2pcs

4-2. Accuracy index.

Accuracy: ±% reading + word . The guarantee period is 1 year from the date of delivery.
Temperature: 18°C to 28°C.Humidity: <80%.

4-2.1 DC Voltage

Range	Resolution	Accuracy
200mV	0.1mV	±(0.5%rdg + 2dgt)
2V	0.001V	
20V	0.01V	
200V	0.1V	
600V	1V	±(0.8%rdg + 2dgt)

4-2.2 AC Voltage

Range	Resolution	Accuracy
200mV(40Hz-200Hz)	0.1mV	±(1.0%rdg + 3dgt)
2V (40Hz-200Hz)	0.001V	
20V (40Hz-200Hz)	0.01V	
200V (40Hz-200Hz)	0.1V	
600V (40Hz-200Hz)	1V	±(1.2%rdg + 3dgt)

*Input resistance:10MΩ
*Display: RMS value (effective value).
*Maximum input voltage: 600VDC or 600VAC RMS.

4-2.3 Resistance

Range	Resolution	Accuracy
200Ω	0.1Ω	±(0.8%rdg +2dgt)
2kΩ	0.001kΩ	
20kΩ	0.01kΩ	
200kΩ	0.1kΩ	
2MΩ	0.001MΩ	
20MΩ	0.01MΩ	±(1.0%rdg +2dgt)

4-2.4 Diode

Function	Resolution	Remark
⊣⊢	0.001V	Display the approximate value of diode forward voltage

*Forward direct current: about 1mA.
*Reverse DC voltage: about 2V.

4-2.5 Continuity

Function	Remark
•))	If the resistance of the tested circuit is less than 30Ω ,the buzzer inside the meter will sound.

*Open circuit voltage is about 0.5V.

4-2.6 Capacitance

Range	Resolution	Accuracy
20nF	0.01nF	±(4.0%rdg + 5dgt)
200nF	0.1nF	
2μF	0.001μF	
20μF	0.01μF	
200μF	0.1μF	
2mF	0.001mF	

4-2.7 Direct Current

Range	Resolution	Accuracy
200μA	0.1μA	± (1.5% rdg + 3dgt)
2000μA	1μA	
20mA	0.01mA	
200mA	0.1mA	
10A	0.01A	

4-2.8 Alternating Current

Range	Resolution	Accuracy
200μA	0.1μA	±(1.5%rdg + 4dgt)
2000μA	1μA	
20mA	0.01mA	
200mA	0.1mA	
10A	0.01A	

*Overload protection: μA /mA range: F250mA/600V fuse (Fast fuse).10A range: F10A/600V fuse(Fast fuse).
*Maximum input current: mA terminal: 250mA, 10A terminal: 10A.

4-2.9 NCV

Function	Resolution
NCV	0-3level

4-2.10 Frequency

Range	Resolution	Accuracy
20kHz	0.01KHz	± (1.5%rdg+5dgt)

5. Measurement operation

5-1 DC & AC voltage measurement

Warning

Do not measure any voltage higher than the effective value of 600V DC or 600V AC to prevent electric shock or damage to the meter.

❶. Turn the rotary switch to"V⎓" or"V⏦" .
❷. Connect the black test lead to the "**COM**" terminal and red test lead to the"**V**" terminal.
❸. Measure the voltage of the circuit under test with the test lead. (parallel connection).
❹. Read the measured voltage value and voltage polarity on the display. on the display.

NOTE:
Sometimes the meter will display several words, in DC 200mV and AC 200mV range, even if there is no input or test lead connected. In this case, short-circuit the "**V**" and "**COM**" terminals to make the display return to zero.

5-2 Measure Resistance

Warning

In order to avoid damage to the meter or the equipment under test, before measuring the resistance, the power supply of the circuit under test should be cut off and all high-voltage capacitors should be fully discharged.

❶. Turn the rotary switch to " Ω ".LCD display "OL".
❷. Connect the black test lead to the "**COM**" terminal and red test lead to the "Ω" terminal.
❸. Measure the resistance of the circuit under test with the test leads.
❹. Read the measured resistance on the display.

NOTE:
When measuring low resistance, in order to measure accurately, the measured resistance needs to subtract the short-circuit resistance of the two test leads.
It is normal for high resistance measurement when it takes a few seconds for the reading to stabilize.

5-3 Measure Capacitance

Warning

In order to avoid damage to the meter or the equipment under test, before measuring capacitance, the power supply of the circuit under test should be cut off and all high-voltage capacitors should be fully discharged.

❶. Turn the rotary switch to "⊣⊢" .LCD display "0.00 nF".
❷. Connect the black test lead to the "**COM**" terminal and red test lead to the "⊣⊢"terminal.
❸. Measure the capacitance of the circuit under test with the test leads.
❹. Read the measured capacitance on the display.

NOTE:
It is normal for high capacitance measurement when it takes a few seconds for the reading to stabilize.

5-4 Measure AC or DC Current

Warning

Do not try to measure current on the circuit,when the voltage between the open circuit voltage and the ground exceeds 250V . If the fuse is blown during measurement, you may damage the meter or hurt yourself.
In order to avoid damage to the meter or the equipment under test, please check the fuse of the meter before measuring current. When measuring, use the correct input terminal ,rotary switch and range. Do not connect the other end of the test lead to any circuit in parallel,When the test lead is plugged into the current input terminal.

Use the "**FUNC.**" to switch between DC and AC measurement modes.
❶. Turn off power to the circuit,Turn the rotary switch to a suitable current gear.
❷. Connect the black test lead to the "**COM**"terminal and the red test lead to the corresponding current input terminal .
❸. Connect the test leads in series to the circuit.
❹.Turn on power to the circuit , Read the measured current on the display.If the LCD display "OL" , please select a higher range.

NOTE:
(1) The connection time should not exceed 10 seconds when measuring 5-10A high current, the test data will not be stable due to heating.
(2) The measurement interval takes 3-5 minutes when multiple measurements are made.

5-5 Test Diodes

Warning

In order to avoid damage to the meter or the equipment under test, before the diode measurement, the power supply of the circuit under test should be cut off and all high-voltage capacitors should be fully discharged.

❶. Turn the rotary switch to the "⊣⊢•))" , and push "**FUNC.**" to switch to the "⊣⊢" .
❷. Connect the black test lead to the "**COM**" terminal and red test lead to the "⊣⊢" terminal.
❸. Connect the black test lead to the cathode and the red test lead anode of the tested diode.
❹. The meter will display the forward bias value of the diode under test. If the polarity of the test lead is reversed, the meter will display "OL".

5-6 Test for Continuity

Warning

To avoid damage to the meter or the device under test, before the test for Continuity, the power supply of the circuit under test should be cut off and all high-voltage capacitors should be fully discharged.

❶. Turn the rotary switch to "⊣⊢•))" .
❷. Connect the black test lead to the "**COM**" terminal and the red test lead to the "•))" terminal .
❸. Measure the resistance of the circuit under test with the test leads.
❹. The buzzer will sound continuously if the resistance of the circuit under test is less than 30Ω.

5-7 Measure Frequency

Warning

Do not measure the frequency of any voltage higher than 250V DC or AC RMS to prevent electric shock or damage to the meter.

❶. Turn the rotary switch to the "**Hz**" .
❷. Connect the black test lead to the "**COM**" terminal and red test lead to the"**Hz**" terminal.
❸. Measure the frequency of the circuit under test with the test leads.

5-8 NCV Test

❶. Turn the rotary switch to "**NCV**" .
❷. Place the top of the meter close to the object to be measured. If the meter detects AC voltage, the LCD will display the corresponding horizontal lines (high, medium, low) according to the detected signal strength, and the buzzer will sound different frequencies.

NOTE:
①: Even if there is no indication, voltage may still exist. Do not rely on NCV detectors to determine whether there is voltage on the wire. The detection operation may be affected by factors such as socket design, insulation thickness and type.
②: When the instrument input terminal input voltage, due to the existence of induced voltage, NCV test may also detect AC voltage.
③: Interference sources in the external environment (such as flashlights, motors, etc.) may falsely trigger NCV detection.

6. Maintenance

6-1. Replace Battery

It needs to replace battery when the "▭" symbol appears on LCD.
❶ Turn off the power.Unplug the test wire.
❷ Open the battery cover with a screwdriver and remove the battery
❸ Put in the battery of the same specification and fix the battery cover.

6-2.Replacee Fuses

❶ Unplug the test line first, and shut down.
❷ Open the back cover with a screwdriver and take out the broken fuse.
❸ Insert a fuse of the same specification, replace the back cover, and fix the screws.

6-3. Maintenance

please use a soft cloth to clean the surface of the instrument when necessary. Do not use organic solvents or abrasives that corrode or dissolve the case.

折页后尺寸105*73mm展开尺寸511*210mm